Option Manual AX-201
Coplanarity

Assembléon

Integrated electronics manufacturing solutions

Document . . . .   **Option Manual AX-201 coplanarity**
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Table of contents

1. Introduction

1.1. General

This manual describes the option coplanarity checker for AX-201.
With this option it is possible to check the leads of components for coplanarity during production.

1.2. Project deliveries

With this option the following items are delivered:

- Option manual
- Coplanarity checker module (sensor + controller)
- Cables to connect the laser to power Ethernet and safety circuit
- Hub
- Mounting material for mounting the module in the machine including vacuum calibration plate and safety relais.
- AX-201 control software installation CD's including data files for the components **SO8** and **TSSOP48** and coplanarity checker module software.
- PPS Pro installation CD's (includes optimizer with Coplanarity support)
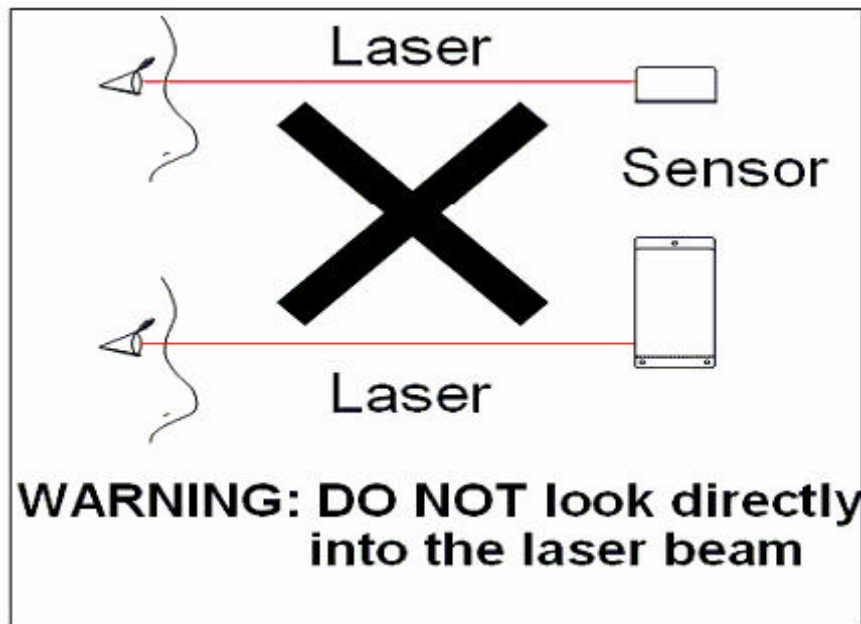- Laser warning labels

2. Safety

2.1. General Information

The laser light sources used in LMI Sensors are semiconductor lasers emitting visible light.

The LMI Laser Sensor used is a 3B/IIIb classification.

> **Caution!** Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

The following safety regulations are applied;
1. International Standard IEC 60825-1 (2001-08) Consolidated edition,
Safety of laser products – Part 1: Equipment classification, requirements and user's guide
- Special emphasize §10; Safety precautions
- Special emphasize §12.5.2 Class 3B Laser Products
  On this Laser **NO CORRECTIVE MAINTENANCE** is performed. See chapter 5.1.

2. Technical Report TR 60825-10, safety of laser products
– Part 10. Application guidelines and explanatory notes to IEC 60825-1
3. Laser Notice No. 50,
FDA and CDRH http://www.fda.gov/cdrh/rad-health.html

2.2.   Laser Classification

The used laser is a **Laser class 3B/IIIb laser** component:

Class 3B/IIIb components are unsafe for eye exposure. Usually only ocular protection would be required. Diffuse reflections are safe if viewed for less than 10 seconds.
Labels reprinted here are examples relevant to the laser classes. For detailed specifications observe the label on your coplanarity laser.

2.3.   User Precautions & OEM Responsibilities

The specific user precautions as specified in IEC 60825-1 and FDA CFR Title 21 Part 1040 are:

Requirements	Class 3B/IIIb Laser
Remote interlock	Required See § 2.3.1
Key control	Required. See § 2.3.2 Cannot remove key when in use
Power-On delays	Required. See § 2.3.3
Beam attenuator	Required. See § 2.3.4
Emission indicator	Required. See § 2.3.5
Warning signs	Required. See § 2.3.6
Beam path	Terminate beam at useful length (safety covers)
Specular reflection	Prevent unintentional reflections
Eye protection	Required under special conditions
Laser safety officer	Required (See §10; Safety precautions of the IEC 60825 standard)
Training	Required for operator and maintenance personnel

LMI Class 3B/IIIb laser components do not incorporate the safety items in the table above. These items are added and completed by Assembléon. Therefore the LMI Laser Sensor should not be operated outside the machine.

2.3.1. Remote Interlock

A remote interlock connection must be present in Class IIIB laser systems. This permits remote switches to be attached in serial with the key lock switch on the controls. The deactivation of any remote switches must prevent power from being supplied to any lasers.
In the AX-201 with coplanarity checker this is covered by the separate E-stop circuit for the laser. The 'AX-201 Enabling switch' will not enable the Laser. For detailed information see chapter 3.2.2 Electrical Diagram

2.3.2. Key Control

A key operated master control to the lasers that prevents any power from being supplied to the lasers while in the OFF position. The key can be removable in the OFF position but the switch must not allow the key to be removed from the lock while in the ON position.
In the AX-201 with coplanarity checker the Machine Mains switch with pad-lock does not allow any power being supplied to the laser. For information on use of the Mains switch with a padlock see chapter H7 Maintenance 1st 'NOTE'

2.3.3. Power-On Delays

A delay circuit is required that illuminates warning indicators for a short period of time prior to supplying power to the lasers.
In the AX-201 with coplanarity checker a delay circuit is created in the startup of the pick and place process.

2.3.4. Beam Attenuators

A permanently attached method of preventing human access to the laser radiation other than switches, power connectors or key control must be employed. On the laser sensor on the AX-201, the beam attenuator is supplied with the sensor as an integrated mechanical shutter.
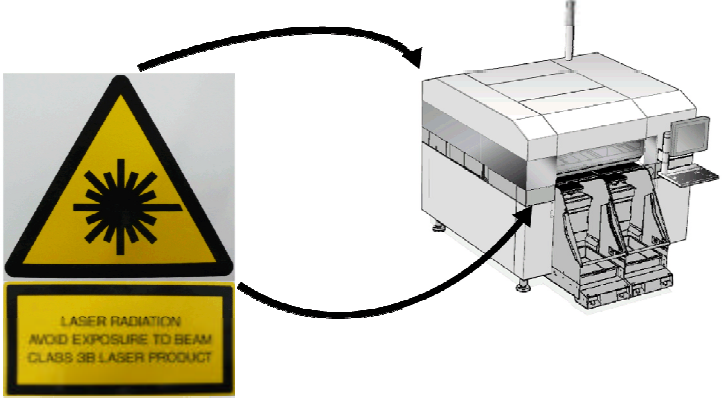See chapter 5.1 for detailed information.

2.3.5. Emission Indicator

It is required that the controls that operate the sensors incorporate a visible or audible indicator when power is applied and the lasers are operating. If distance (>2 m between sensor and controls) or mounting of sensors intervenes with observation of these indicators, a second power-on indicator should be mounted at some readily observable position. When mounting the warning indicators, it is important not to mount them in a location that would require human exposure to the laser emissions.
In the AX-201 with coplanarity checker the emission indicator's are integrated in the 'align process warnings'.

2.3.6. Warning Signs

Laser warning signs must be located in the vicinity of the sensor such that they will be readily observed.
Location and example of the warning stickers on the AX-201 with coplanarity checker

• One sign on the front cover • On sign on the rear cover	
• One sign on each side of the coplanarity checker	

2.3.7. Coplanarity Laser Safety Specification

- **Laser specifications:**

Laser Classification: 3B/IIIb laser component
Peak Power: 130mW
Emitted Wavelength: 660nm
Pulse Frequency: 1kHz
Pulse Width: 42 μs fixed

Laser safety connections
The coplanarity laser safety connections are described in chapter 3.2.2 of this manual

3. installation
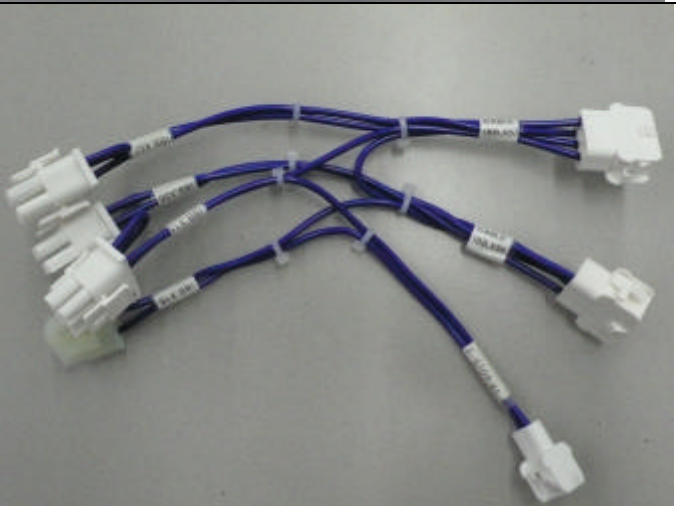
3.1. Prerequisites

- Existing AX-201 must be upgraded to SW version 2.0 or higher.
- Hardware conform PA 2410/00.
- A padlock must be available during installation.
- PPS Pro Installation CD version 8.4 and patch 5 and A-series optimizer CD version 2.2 or higher.

3.2. Hardware installation

3.2.1. Parts

Nr	Description	Image
1.	Ethernet switch with Ethernet cables	
2.	Coplanarity laser sensor module, including safety relais.	

3.	FireSync station	
4.	Sensor cable	
5.	IBB Safety cable	

6.	Safety extension cable	
7.	Power supply for FireSync station and Power supply for Coplanarity sensor	
8.	Power connection block and power cable	

3.2.2. Diagrams

3.2.2.1. Wiring diagram
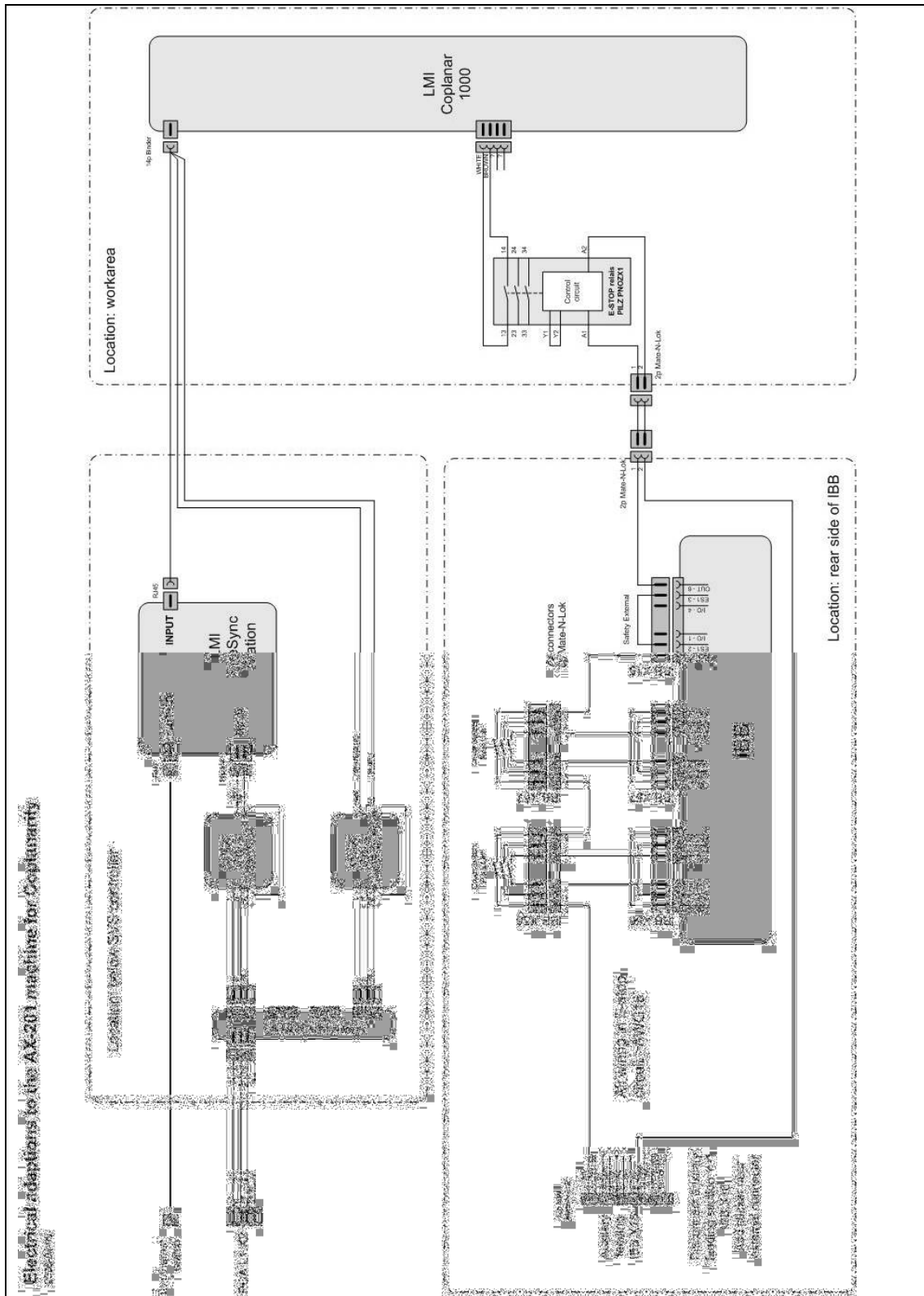
3.2.2.2. Power and Safety Circuit
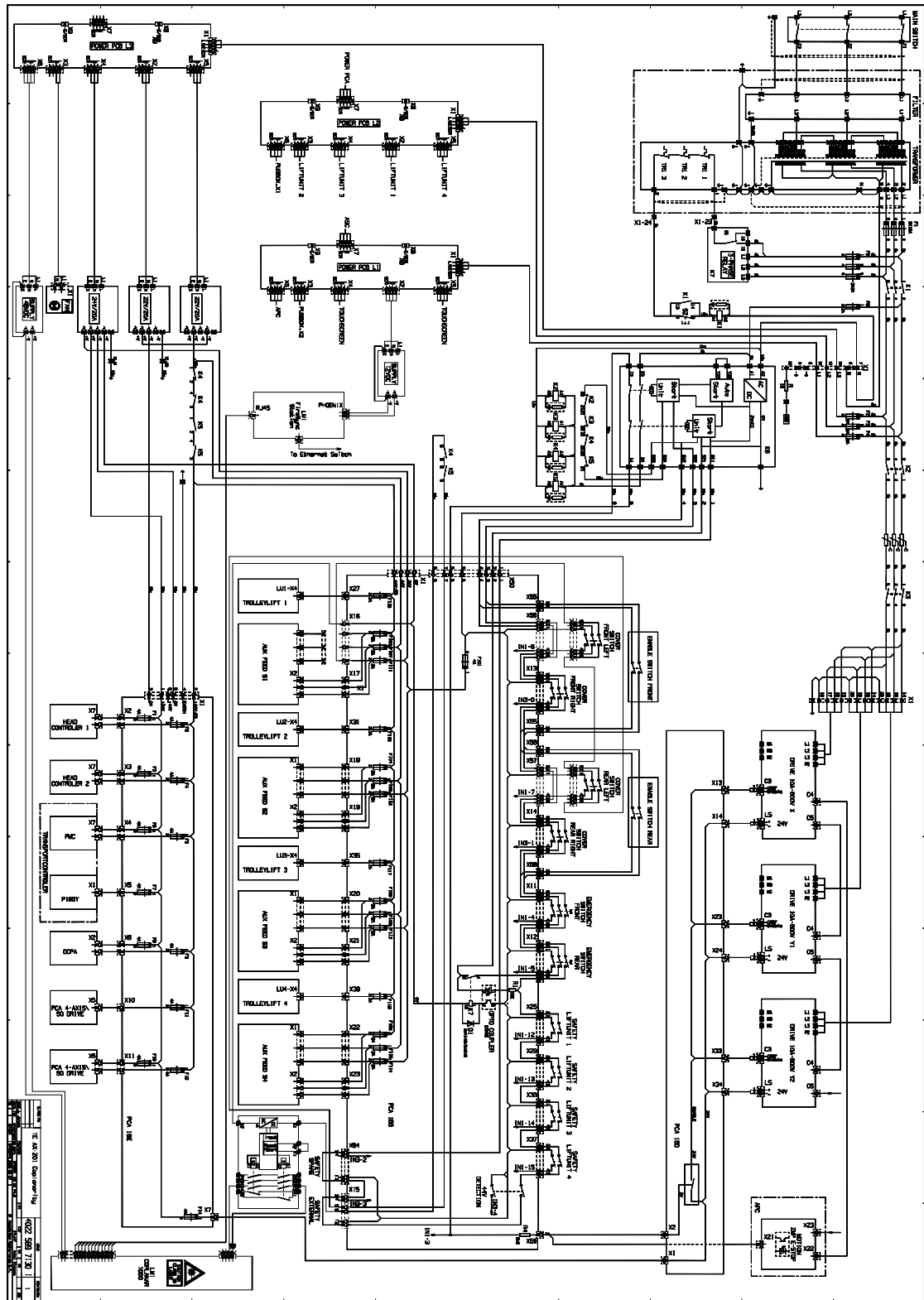
Remark:

The 12V power supply for "LMI Firesync Station" is connected to PCB L1 position X3 instead of position X2. The 230V connection block is not available. Both is wrong in this drawing and will be updated!!

3.2.2.3. Ethernet diagram
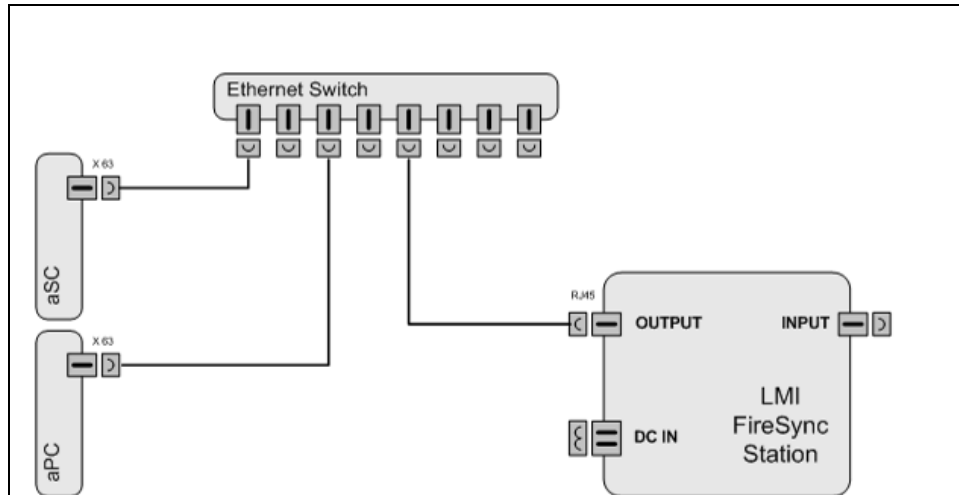
3.2.2.4. Sensor-Safety circuit interconnection diagram

Basic diagram;
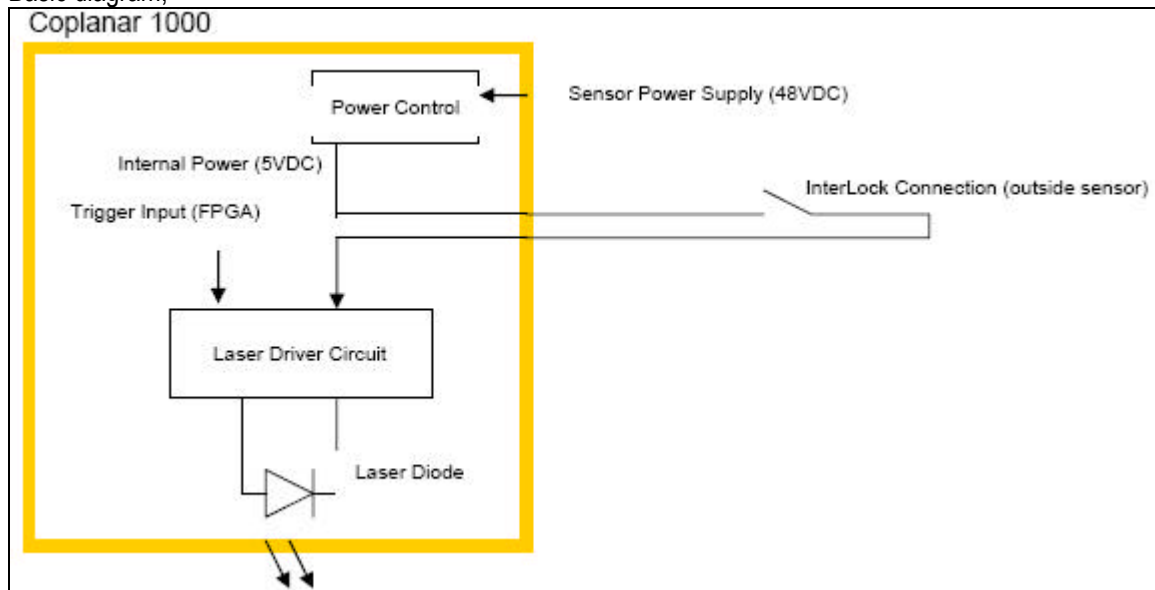
Connection Laser safety relais:
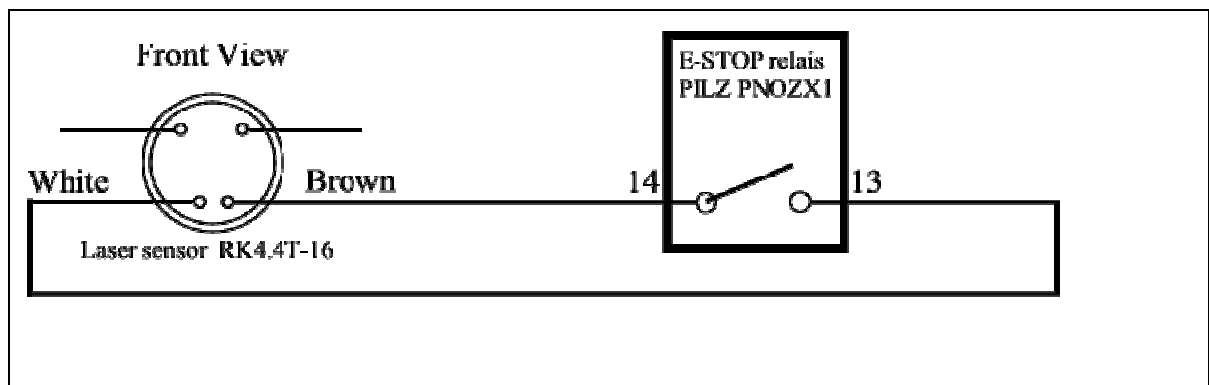
3.2.2.5. FireSync-Sensor interconnection diagram
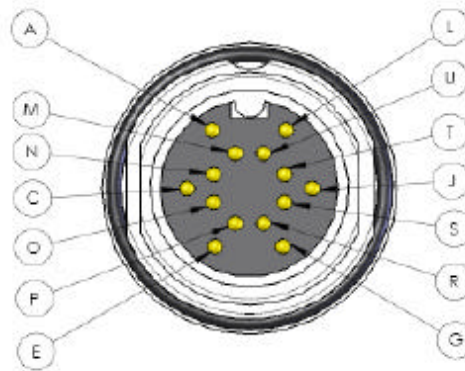
The user should use the following cable diagram to manufacture cables of length appropriate to their application using the listed recommended parts.
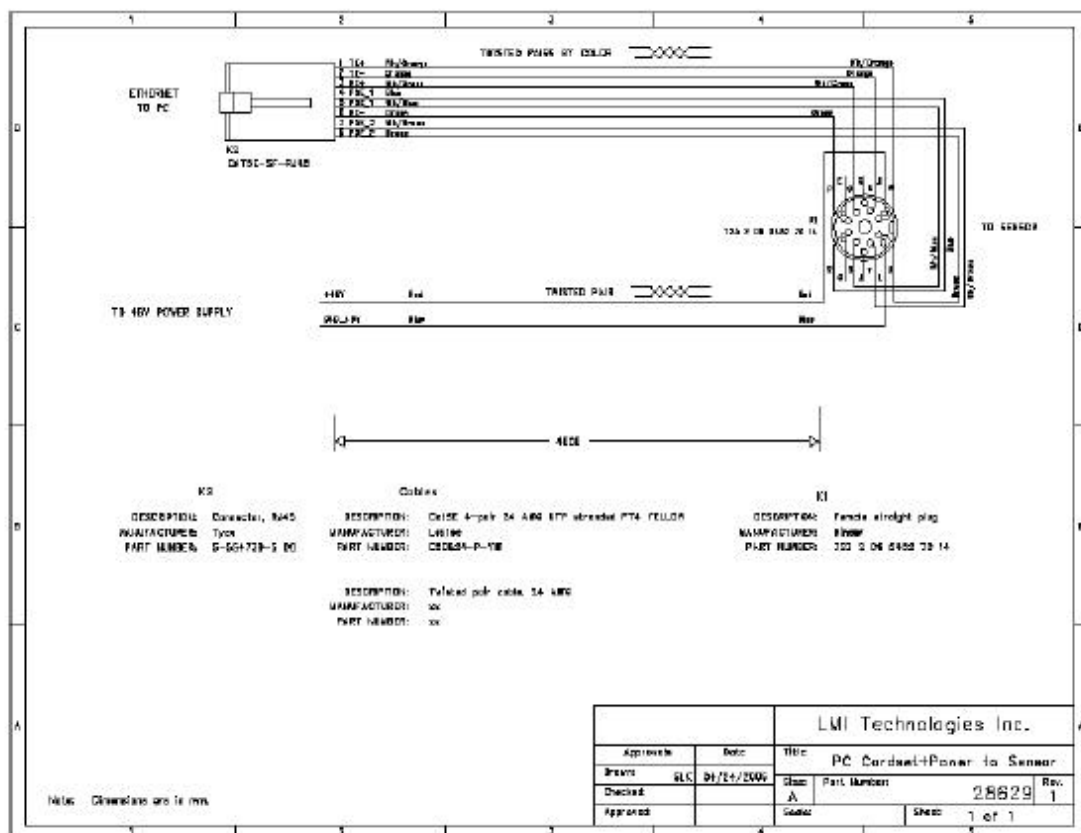
3.2.3. Hardware installation Instruction

- Power down the AX-201.
- Lock the main switch with a padlock
- Remove the right side cover to be able to access the rear of the aPC and aSC
- Pull out the control supply unit at the rear of the machine.
- In case the machine is not equipped with an Ethernet Hub, these steps are not necessary. Disconnect the crosslink cable between X63 of the aPC and X63 of the aSC.
- Discard the cable
- Place the Ethernet switch in the base underneath the aSC and aPC
- Take the power cable from the Ethernet Switch and lead this to the front of the machine
- Connect the new Ethernet cables from the HUB to the X63 of the aPC and the X63 of the aSC
- Place the power connection block in front of the machine
- Connect 220V power cable for the SVS Pro controller into the power connection block
- Connect the power cable from the ethernet switch box.
- Place the FireSync controller and power supply in front of the machine
- Connect a Ethernet cable from the Switchbox to the 'OUT' connector of the FireSync controller. Lead the cable trough the opening in the base beside the aPC.
- Connect 220V power from the extension cord to the power connection block PCA L1 (position X3).
- Connect 12V cable from the power supply to the FireSync station.
- Place Power supply for Coplanarity sensor in base.
- Connect 220V cable to Power PCB L3 (position X6).
- Connect LMI cable to 48v connection of Power supply for Coplanarity sensor.
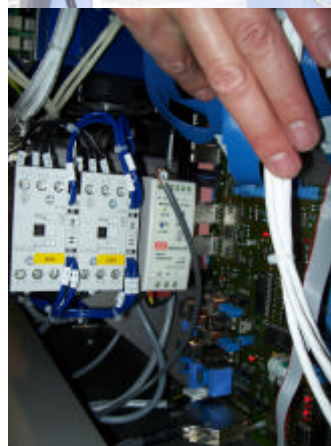
- Place the coplanarity sensor unit in the base.
  If applicable remove the reuse plate or camera unit.
- Place the Sensor completely over the dowel pins.
- Fasten the two bolds.
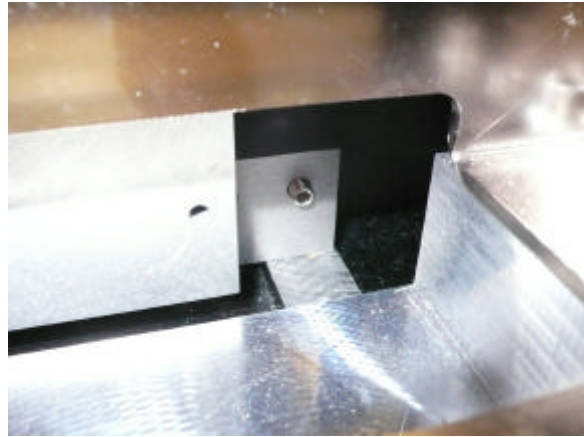
- Connect the sensor cable to the sensor and to the 'IN' connection of the FireSync station.
  Lead the cable trough the base.
- Connect the sensor safety cable to the safety extension cable. Lead the cable to the IBB board.
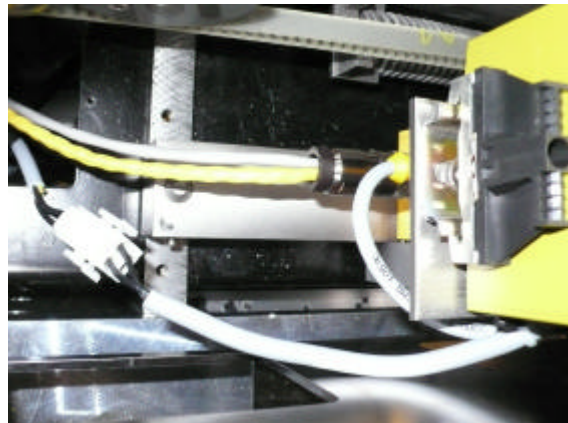
- On the IBB board, disconnect X15, X56 and X57 cables.
- Connect the IBB Safety cable to the IBB X56, X57, X16 and X15 connector.
- Connect the X56 and X57 cables to the Safety cable plugs X56 and X57.
- Connect the sensor safety extension cable to the IBB safety cable.
- Place the FireSync station and power supply in the SVS-Pro controller slot.
- Close all covers.
- Power-up the machine and close the 'auto start.' window.
- Start with installing the software.
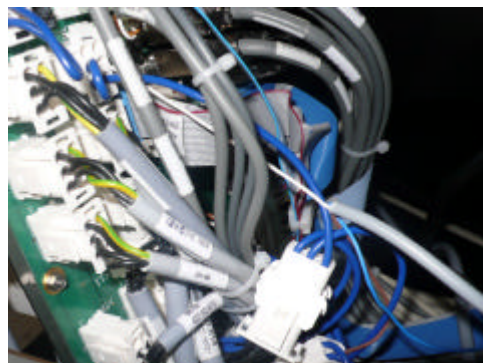
3.3. Software installation

3.3.1. Parts

With the coplanarity checker, 3 files are changed or introduced in the AX-201.
The cal.cfg (only changed), the cpl.cfg and the settings.xml

3.3.1.1. cal.cfg

The cal.cfg new fields are added with reference to the position of the coplanarity checker on the AX-201.

The new files are:

```
[COPLANARITY_UNIT_FRONT]
;  MCS position of measurement beam centre
   UNIT_REF_POS_XY        = -344.228, 6.0

;  MCS Z-level of measurement beam. This is the reference level
   UNIT_REF_POS_Z         = 15.0

;  X offset w.r.t. UNIT_REF_POS_XY to be applied as starting
;  point for trajectory to measurement centre [in mm]
   FLY_IN_ZONE            = 4.0

;  X offset w.r.t. UNIT_REF_POS_XY to be applied as end
;  point for trajectory to measurement centre [in mm]
   FLY_OUT_ZONE           = 12.0

[COPLANARITY_UNIT_REAR]
;  MCS position of measurement beam centre
   UNIT_REF_POS_XY        = -6.244, 663,816

;  MCS Z-level of measurement beam. This is the reference level
   UNIT_REF_POS_Z         = 15.0

;  X offset w.r.t. UNIT_REF_POS_XY to be applied as starting
;  point for trajectory to measurement centre [in mm]
   FLY_IN_ZONE            = 4.0

;  X offset w.r.t. UNIT_REF_POS_XY to be applied as end
;  point for trajectory to measurement centre [in mm]
   FLY_OUT_ZONE           = 12.0
```

3.3.1.2. cpl.cfg

In the cpl.cfg file specific configuration settings are stored that enables the AX-201 to communicate with the coplanarity checker.
The settings are:

```
[GENERAL]
  SYNTAX_VERSION = 1

[CPL]
; Communication Timeout in [ms]
; Timeout in connection to the Coplanarity Host
  COMM_TIMEOUT = 5000

; Measurement Result Timeout in [ms]
  MEASURE_TIMEOUT = 10000

; Connection IP Address of the Coplanarity Host
  HOST_IP = 192.168.1.10

; Save Measurement Result Images
; (Please note that this setting only has effect
;  if the 'DiagnosticsLevel' setting in the SETTINGS.XML file = 1 or 2)
;              Possible values:
;              0 = SAVE IS DISABLED
;              1 = SAVE ON MEASUREMENT ERRORS
;              2 = SAVE EACH MEASURED COMPONENT
  SAVE_IMAGES = 1

; Special setting for internal testing only
  RUN_WITH_HOST_SIMULATOR = 0
```

3.3.1.3. settings.xml

In the settings.xml all data is stored that allows the coplanarity checker to check specific components according specification.
An example of the file:

```xml
<?xml version="1.0" ?>
  <ServerSettings>
    <ScanSpeed>40</ScanSpeed>
    <DiagnosticLevel>0</DiagnosticLevel>
    <ComponentTypes>
    <Type>
      <Name>SO08P127W060</Name>
      <Leads>8</Leads>
      <LeadType>GW</LeadType>
      <LeadTipWidth>450</LeadTipWidth>
      <LeadTipLength>780</LeadTipLength>
      <LeadPitch>1270</LeadPitch>
      <Lead_zTolerance>80</Lead_zTolerance>
      <BodyDimension_ShortSide>3800</BodyDimension_ShortSide>
      <PackageDimension_ShortSide>6000</PackageDimension_ShortSide>
      <BodyDimension_LongSide>5000</BodyDimension_LongSide>
      <PackageDimension_LongSide>5000</PackageDimension_LongSide>
      <BodyDimension_Tolerance>500</BodyDimension_Tolerance>
      <ScanLines>650</ScanLines>
    </Type>
    <Type>
      <Name>TSOP54P080W222</Name>
      <Leads>54</Leads>
      <LeadType>GW</LeadType>
      <LeadTipWidth>400</LeadTipWidth>
      <LeadTipLength>530</LeadTipLength>
      <LeadPitch>800</LeadPitch>
      <Lead_zTolerance>80</Lead_zTolerance>
      <BodyDimension_ShortSide>10160</BodyDimension_ShortSide>
      <PackageDimension_ShortSide>11760</PackageDimension_ShortSide>
      <BodyDimension_LongSide>22220</BodyDimension_LongSide>
      <PackageDimension_LongSide>22220</PackageDimension_LongSide>
      <BodyDimension_Tolerance>1000</BodyDimension_Tolerance>
      <ScanLines>1000</ScanLines>
    </Type>
    </ComponentTypes>
    <Capture>
      <Enabled>0</Enabled>
      <Source>2</Source>
      <Divisor>1</Divisor>
      </Capture>
    <Members>
      <SensorGroup>
      <Name>1</Name>
    <Members>
      <Sensor>
      <Name>Coplanar</Name>
      <SerialNumber>1676</SerialNumber>
      <Enabled>1</Enabled>
    </Sensor>
    </Members>
    </SensorGroup>
    </Members>
</ServerSettings>
```

The following tables describe all sections in the XML file and explain the meaning of the different items. Note that every setting should be specified as a number unless noted otherwise.

Setting	Description
ScanLines	The number of lines to be read before processing starts of the image
ScanSpeed	The speed of the component movement during scanning (in mm/s)
DiagnosticLevel	Specifies whether diagnostic function is used 0 = No diagnostics 1 = Create and sent a diagnostic bitmap of the measurement to the machine. 2 = Level 1 without 'tilt' correction. If the images are saved depends on the setting in cpl.cfg
Name	Describes the name of the component to distinguish different types. **Note**: Name not longer than 15 characters.
Leads	The amount of leads on the component
LeadType	Describes the type of leads (current only 'GW' GullWing)
LeadTipWidth	Width in micrometers of the lead tip
LeadTipLength	Length in micrometers of the lead tip
LeadPitch	Distance between leads in micrometers
Lead_zTolerance	Maximum accepted difference in micrometers for each lead
BodyDimension_ShortSide	Width of body in micrometers excluding leads
PackageDimension_ShortSide	Width of body in micrometers including leads
BodyDimension_LongSide	Length of body in micrometers excluding leads
PackageDimension_LongSide	Length of body in micrometers including leads
BodyDimension_Tolerance	Maximum accepted difference in micrometers for the body to be judged valid
Capture, Enabled	Should be 0 for Result output . This is set to 1 for a specially formatted recording output.
Source	Sets recording source to: 0: Imager 1: FPGA 2: Sensor 3: Server
Divisor	Slows down the system with a factor
Name	Describes the name of the system to distinguish systems. This is a FireSync inherited property. A character string is allowed here. (Coplanar)
SerialNumber	Should be set to the Serial of the connected sensor
Enabled	Should always be 1 (ignored / reserved)

3.3.2. Software installation instruction

3.3.2.1. Install Machine software

NOTE: The AX-201 must be running on 1.13 application software and SI-A-Series-066 must be implemented.

1.   Be sure the CSW is NOT running. Easiest way to do this is when starting up the machine, close the **Autostart** window as soon as possible. In this way the CSW will not startup.

2.   Preferably make a copy of the current installation (ASC and APC directories)
        Use Windows Explorer on ASC to copy asc and apc folder:
        The ASC you can find on "C:\"
        The APC folder you can find on "\\apc\d\user".
        Make a copy of the complete folder on the same location as where they originally are located. As result you have "C:\copy of asc" map on the ASC, and "\\apc\d\user\copy of apc" on the APC.

3.   Rename them to names that tell you something, like
        "asc_[DC#]_[SW_VERSION]_[DATE]" and **"apc_[DC#]_[SW_VERSION]_[DATE]"**

        <u>Example:</u>
        You make a backup on machine with DC number 111, software version is 1.0.820 and the date is august 3 2007, then the folders name will become:
        asc_111_1.0.820_2007-08-03 and also **apc_111_1.0.820_2007-08-03**

4.   Select Full installation during install (NOT Upgrade install).

Control Software Setup   ✕

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Application software installation.

Installed version AX-201 2.0
About to install version: AX-201 2.0

○ Reinstall AX-201 2.0 (Data reuse)

◉ Full install AX-201 2.0 (No data reuse)

InstallShield

                                                    < Back   Next >   Cancel
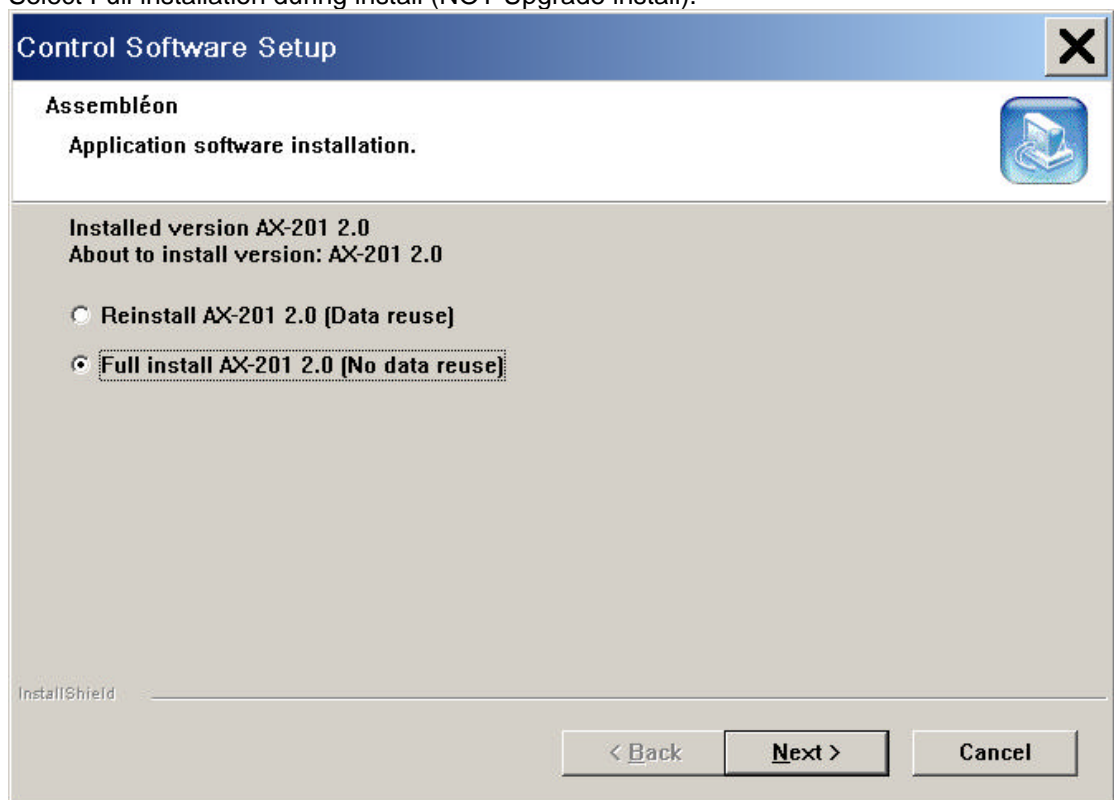
1. In the next screen choose the option "YES" to reuse the data file groups

Reuse of data file groups

The following data file groups are going to be reused when available:
* Configuration data
* PTDB data
* Verification data
* Action spec data
* Mis data
* Calibration data
* Special gripper data
* PTDB archive data
* Machine status data

The following data file groups can not be reused:

Do you want to reuse the datafile groups?

| Yes | No |
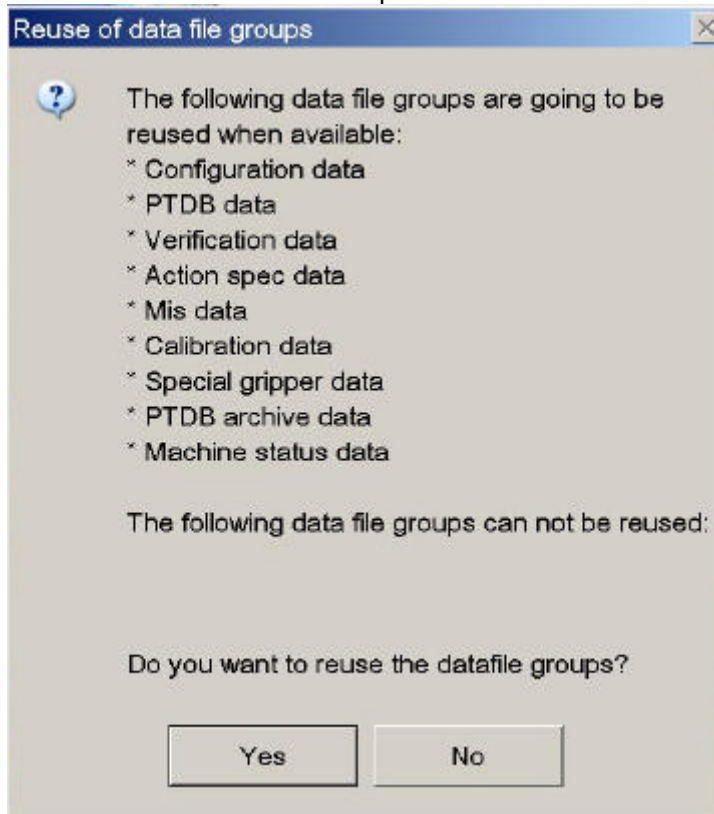
6. Check the box to reuse the package types already available.

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Reuse current package (PTDB) files

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Make your choice and click Next to continue.

☑ Reuse the package types already available

InstallShield

| < Back | Next > | Cancel |
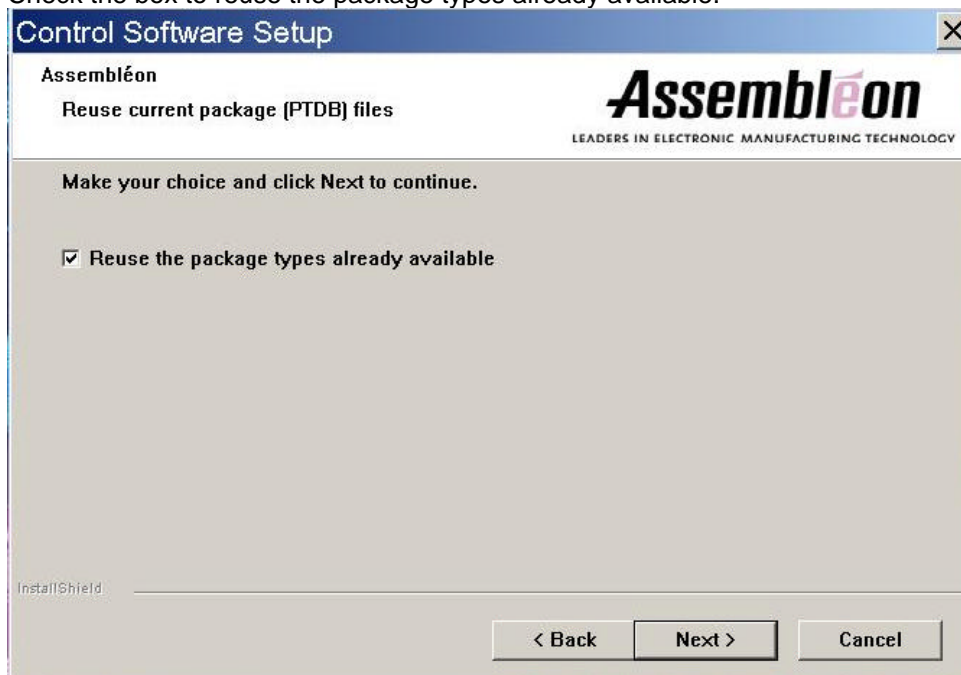
7. Click on "NO" to not enter a new serial number for your machine.

Enter new installation data

Installation data:
PA type: PA 2410 / 00
Serial number: 505

Do you want to enter new data?

[Yes]   [No]

Data is restoring

Restoring reuseable data. Please wait.
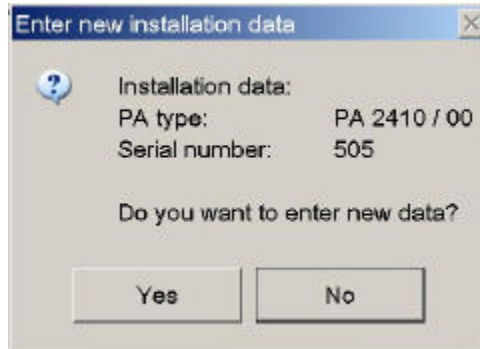
8. Select the correct configuration of your machine. Be aware that this **<u>MUST</u>** be the same as it was before.

Control Software Setup

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Reuse current package (PTDB) files

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Please select the XY Drive configuration mounted on the machine
NOTE: The configuration mounted on the machine is important, NOT the configuration

( ) Single sided (PH-HA heads only mounted)

( ) Double sided (PH-HA + PH-DV heads mounte

InstallShield

[< Back]   [Next >]   [Cancel]

9.   At the end of the installation the Software will popup a question   like, if it can startup right now. You **MUST ALWAYS CHOOSE!!!!** the option "**No, I will restart my computer later**"
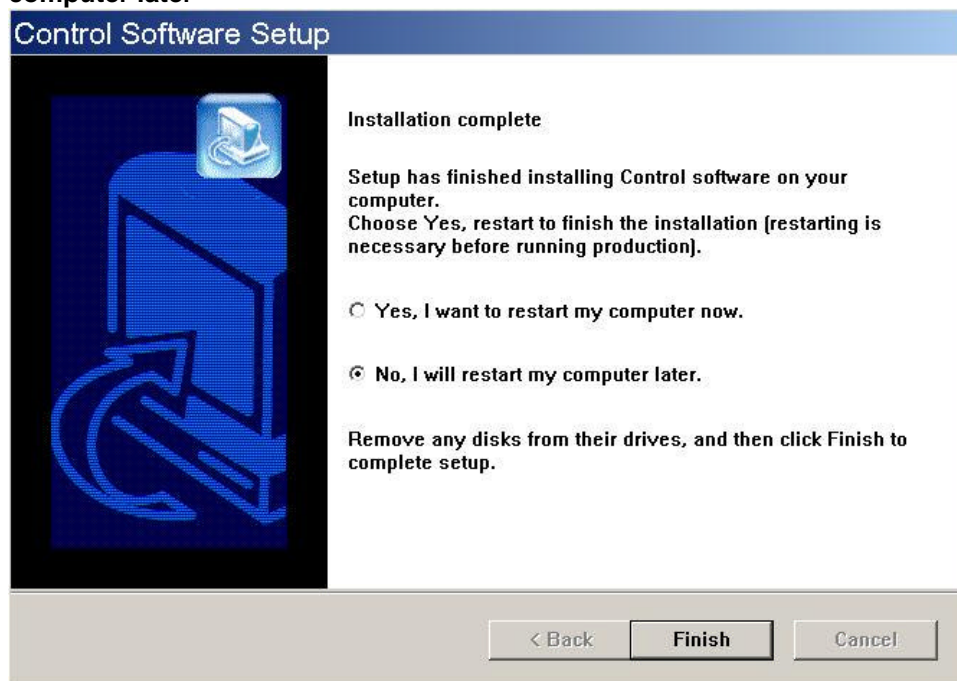

DO NOT RESTART THE MACHINE AT THIS MOMENT!

10.   All automatic backups have been made **EXCEPT** for the feeder files and toolbit file. You can place them back from your manual made backup.
- all SPECIAL feederfiles   from   \\apc\d\user\apc\config\fdr
- all SPECIAL toolbitfiles   from   \\apc\d\user\apc\config\toolbits
if you have SPECIAL toolbits then also copy the following two files back from your manual made backup;
- cp_tlb.lst and toolbits.lst   \\asc\config
- cp_tlb.lst and toolbits.lst   \\apc\d\user\apc\config\toolbits

11. Restore the AX-201 Setup
- Log an as Maintenance and service engineer
- Go to "setup", "Module configuration" and complete the setup as described in the user
  reference manual.
-. On the tab page "Reuse" and "Coplanarity" check the correct checkbox for the position
  of the reuse and coplanarity position.
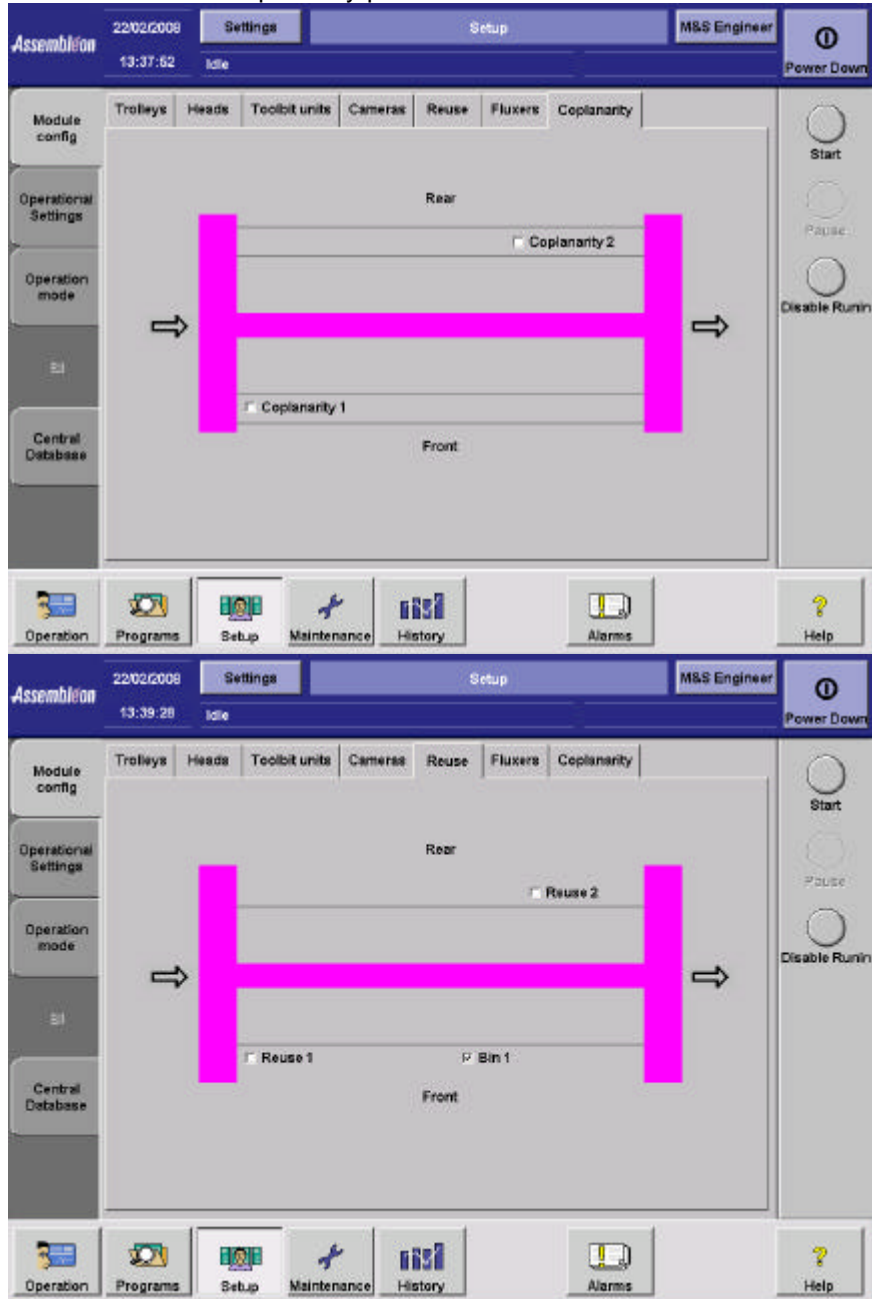
3.3.2.2. Check the serial number

The coplanarity checker has a serial number. this must be set in the "Settings.xml" file. In case of a mismatch the coplanarity checker will not work.
- Open the "settings.xml" file in the'\user\aPC\config\machine\' directory on the aPC.
- Check if the number in the field " <SerialNumber>**xxxx**</SerialNumber>" is the same as on the coplanarity laser sensor itself.
- The number can be found on the side of the laser
- Change if applicable
- Save the settings file

3.3.2.3. Check Component file names

The component file names of components that are checked on coplanarity must have the same name in the "Settings.xml" and the component file
- Open the "settings.xml" file in the'\user\aPC\config\machine\' directory on the aPC.
- Compare the names used for the described components (SO8 and TSSOP48)
- If the names used in the 'Settings.xml' file are different from those from the component files; change the names in the settings file.
- Save the file.
  NOTE: File names longer than 15 characters will automatically shortened by the coplanarity software. All names should be less than 15 characters.

3.3.2.4. Check setting of the service image

In normal production the service image should be switched off.
To disable this function ; open the 'cpl.cfgl' and change the attribute "SAVE_IMAGES".
The function has 3 different settings;
1. No image is saved. The "SAVE_IMAGES" setting must be set to '0'.
2. Only save the image in case of an coplanarity error. The "SAVE_IMAGES" setting must be set to '1'.
3. Save all images. The "SAVE_IMAGES" setting must be set to '2'.

All images are saved in the 'user\apc\diag' folder on the aPC. The maximum number of images saved is 1000. More saved pictures will overwrite older ones.
Setting '2' will slow down the machine performance with a factor

Save the file with the "SAVE_IMAGES' setting on "1".

3.3.2.5. Teach x, y coordinates.

Before the AX-201 can use the coplanarity checker it is mandatory to first load the placement programs from PPS Pro (see chapter 3.4), create an order and measure the place (X and Y coordinate) of the installed checker and update the "cal.cfg".

- Go to the teach menu and use the BA camera to measure the coordinates of the marker in between CA1 & CA2
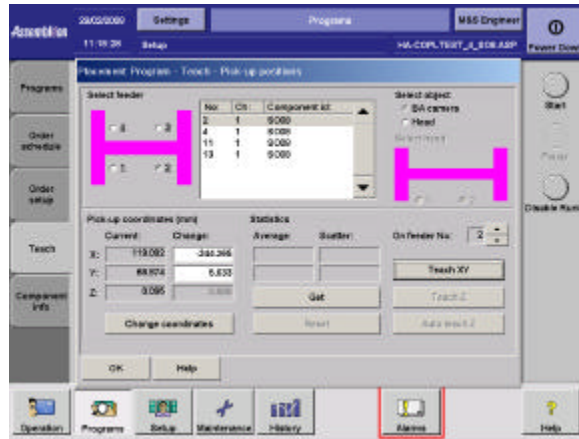
- Store the correction and write this value down. This is point 'A'.
- Now jog to the centre of the coplanarity checker
  Point "B" if placed on the front side, "C" if placed at the rear side.
    - o The centre of the coplanarity checker is given in point 'D'.
    - o An example of the immage on the machine is given at point 'E'.
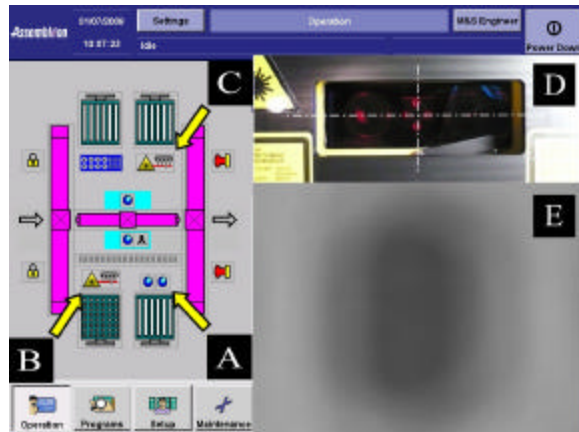
- Select "OK".
- Writhe down the values from the "change" field.
- Open the "cal.cfg" file in the 'user\apc\diag' folder.
- For front side, fill out the values from the change field in the " HEAD_MARKER_POS_XY " field.
- For rear side, Subtract the values from the 'change' field from the 'current' field. Fill out the value in the HEAD_MARKER_POS_XY field of the [CA_UNIT_REAR] block.
- Save the cal.cfg file.
- Close the TEACH window without saving changes to the placement program/order.
- Power-down the AX-201.
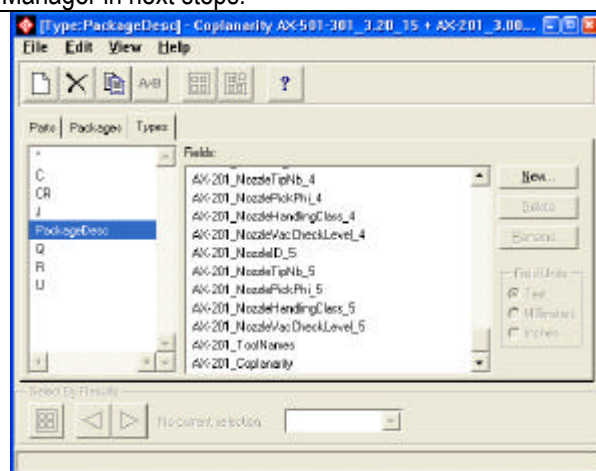- Power-up.
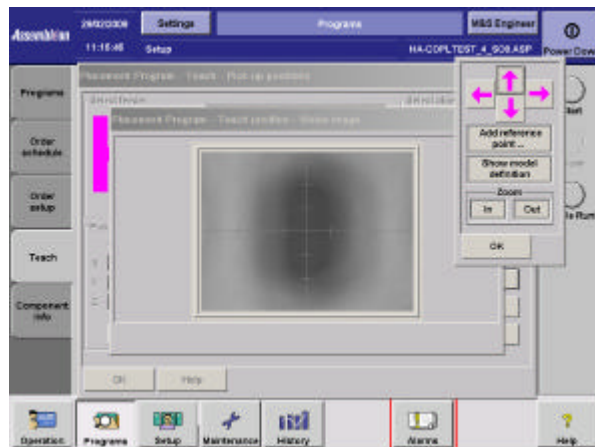
3.4. PPS Pro software

3.4.1. Install PPS PRo Software

- Installation of the PPS-Pro front-end and optimizer software with coplanarity functionality is done on the standard way. See the PPS Pro manual for information.
- Only use the PPS Pro version 8.4 with service pack (SP) 8.4 and optimizer version 2.2 for AX-201 with coplanarity checker
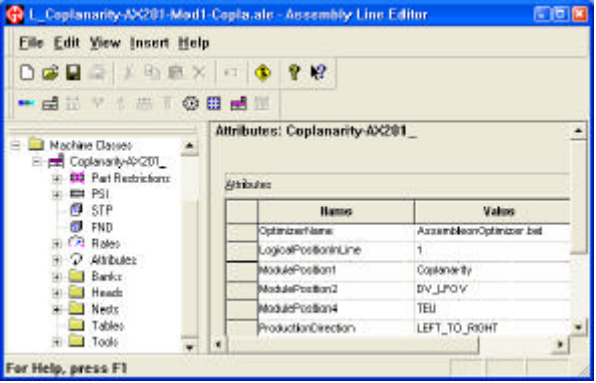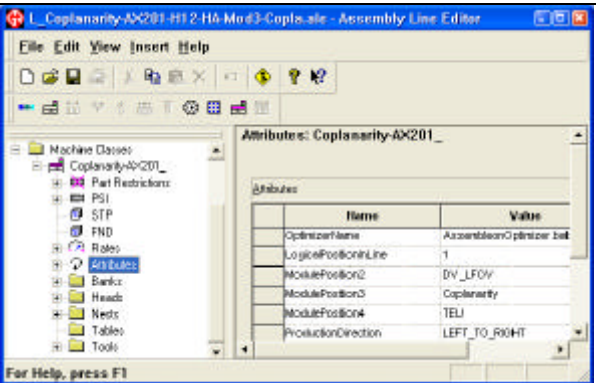
3.4.2. Update PSI file

Update of the PSI file with the Part Information Manager in next steps:

- Add the AX-201-Coplanarity field to the PackageDesc type - Update the SO08P127W060 package on next fields: - AX-201_Coplanarity = YES - Create the TSSOP54 package: Copy PLCC052P127W200 to TSOP54P080W222 - Update next fields: - BodyLength = 22.220 - BodyWidth = 11.760 - Height = 1.1 - FeederTypeName = PALLET - Philips_TrayID = TS09X12 - Philips_PackagingType = TRAY - AX_ComponentRef = TSOP54P080W222 - AX-201_CompAlignRef = TSOP54P080W222 - AX-201_Coplanarity = YES	

3.4.2.1. Update Ale file

• Open the Assembly Line Editor and update the ALE file.
• Add Coplanarity on module position 1 (configures the reuse unit on position 3 with the help of the AX-201 GUI):
    o Add next Machine – Attribute:
    o ModulePosition1 = Coplanarity.	

• Add Coplanarity on module position 3 (configures the reuse unit on position 1 with the help of the AX-201 GUI):
    o Add next Machine – Attribute:
    o ModulePosition3 = Coplanarity.	

3.4.2.2. Create placement programs

- Create placement programs with PPs-Pro:
  - When the assembly production line consists of an AX301/501 and AX201 with a coplanarity unit then all coplanarity defined components in the PSI file will be mounted on the AX201.
  - When a component must be mounted with coplanarity (PSI file) and no coplanarity unit is configured on the production line then an error message will be generated
- Load the placement programs to the machine

4. Operation

4.1. Functional description

The Coplanarity Checker is an optional module for the AX-201 machine. The Coplanarity checker module checks the leads of components for co-planarity during production. Lead co-planarity is defined as the distance from the lead tip to a reference plane.

For Coplanarity check on the AX-201 the coplanarity sensor is be used. The sensor consists of line light source and a CMOS sensing device.
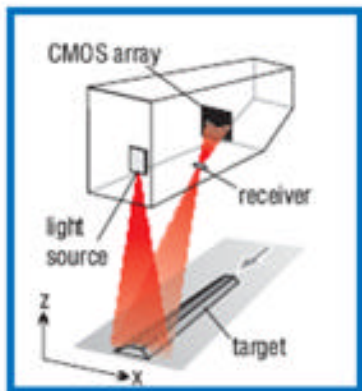

Together with the Y movement of the component over the sensor, a 3D height profile of the component is composed. The 3D height profile is analyzed by the sensor software and parameters from the "settings.xml" file and an Ok not Ok result is communicated to the AX-201 control software.

4.2. User instruction

The production on an AX-201 with coplanarity checker is the same as without checker. Except for the following;

- The run placement program must be created by the special PPS-Pro version that is capable to create programs with the use of the coplanarity checker.
- In the operator screen the checker is visible:
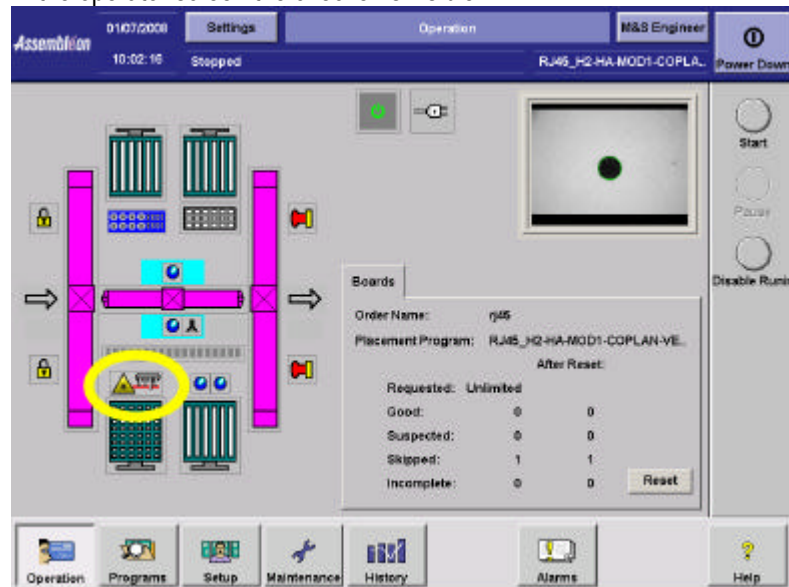
- When the coplanarity checker is enabled, for the applicable components a coplanarity check is performed after the alignment process. (it is not possible to perform coplanarity check before an alignment)
- Possibility to disable the coplanarity checker in the 'Setup - Operational settings' screen:
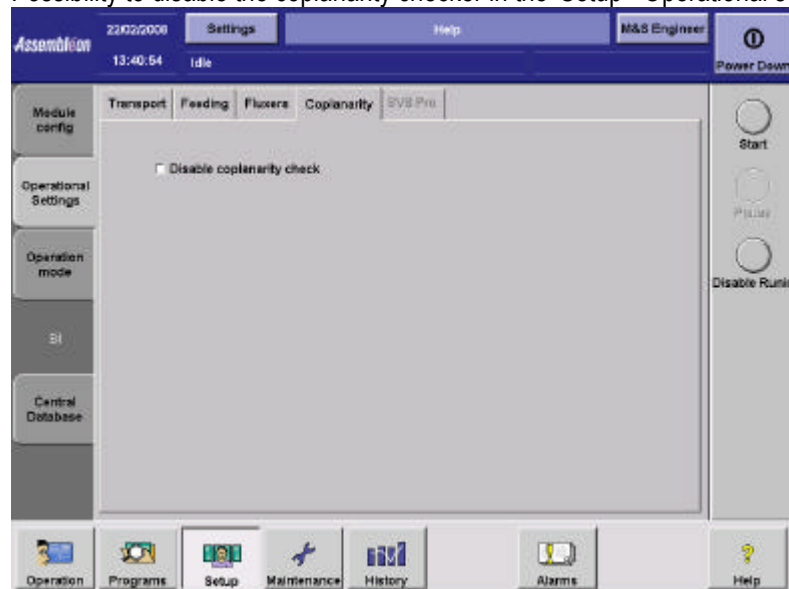
- Restriction in changing component files.
  The AX-201 and the coplanarity checker use a different file (Settings.xml and "componentname".cmp) as data source for their processes. A component name change for components that are checked on coplanarity must be changed in both files. See chapter 3.3.2.3.

4.3. Troubleshooting

It is possible to save images created by the coplanarity checker. See chapter 3.3.2.4 for more information.

For troubleshooting purposes the following error messages are available on the AX-201 :

1. Coplanarity : Communication error
   - Description:
     - o Communication with the coplanarity checker failed.
   - Cause:
     - o The network between APC and coplanarity checker not connected.
     - o The coplanarity checker unit is not correctly started.
     - o The coplanarity checker communication ip and/or port wrong configured.
   - Action:
     - o Check the network connection between the APC and coplanarity checker PC.
     - o Power failure on the coplanarity checker.
     - o Check IP address and port in the CPL configuration file. (See chapter 3.3.1.2)

2. Coplanarity : Communication error
   - Description:
     - o Communication with the coplanarity checker failed, network is available.
   - Cause:
     - o Wrong serial number of coplanarity checker is configured.
   - Action:
     - o Check 'SETTINGS.XML' file in the '\user\aPC\config\machine\' directory for correct serial number. (see chapter 3.3.2.2)

3. Coplanarity : Component definition not defined for coplanarity
   - Description:
     - o The component definition is not found in the 'SETTINGS.XML' file. This file describes the component definition for the coplanarity checker.
   - Cause:
     - o The component description entry is not in the 'SETTINGS.XML' file on the aPC.
   - Action:
     - o Open the 'SETTINGS.XML' file in the '\user\aPC\config\machine\' directory and add the component coplanarity information in this file to solve this problem.

4. Coplanarity : Measurement timeout
   - Description:
     - o Process error: Component measurement timeout.
   - Cause:
     - o Coplanarity checker didn't reply within specified maximum measurement time.
     - o Coplanarity checker obstructed.
   - Action:
     - o Measurement timeout specified in configuration file CPL.CFG is too small!
     - o Check the laser window and remove the obstruction (e.g. components).
     - o Clean glass plate; see the maintenance chapter for instructions.

6. Coplanarity : No component detected
- Description:
  - Process error: Component not detected.
- Cause:
  - Unsatisfactory component.
  - Coplanarity checker could not detect the component.
  - Coplanarity checker obstructed.
- Action:
  - Try another component.
  - Check laser beam of the coplanarity checker.
  - Check the calibration of the coplanarity checker vision system.
  - Check the laser window and remove the obstruction (e.g. components).

5. Coplanarity : No coplanarity sensors found!
- Description:
  - The FireSync station did not find any sensors connected.
- Cause:
  - The coplanarity sensor has no power.
  - Network cable between coplanarity sensor and FireSync station unplugged.
- Action:
  - Check the power supply of the coplanarity sensor.
  - Check the network cable connection between the coplanarity sensor and the FireSync station.
  - Clean glass plate; see the maintenance chapter for instructions.

6. Coplanarity : Coplanarity is not ok
- Description:
  - Process error: Coplanarity not ok.
- Cause:
  - Component coplanarity is unsatisfactory.
  - Coplanarity checker obstructed.
- Action:
  - Check the components (are all leads visible?).
  - Check the pick to see that the component is well picked.
  - Check which package ID is downloaded on the coplanarity checker PC and check that the same package ID is specified for the measured.
  - Check the laser window and remove the obstruction (e.g. components).

7. Coplanarity :Component not recognized
- Description:
  - Process error: Component not recognized.
- Cause:
  - Unsatisfactory component.
  - Component not yet known by the coplanarity checker.
  - Coplanarity checker obstructed.
- Action:
  - Try another component.
  - Check the calibration of the coplanarity checker.
  - Check the laser window and remove the obstruction (e.g. components).

8. Coplanarity : SETTINGS.XML file missing or corrupt!
- Description:
    - o The component definition file 'SETTINGS.XML' on the APC is missing or damaged.
- Cause:
    - o File 'SETTINGS.XML' is missing on the APC. This file must reside in the '\user\aPC\config\machine\' directory and contains the component descriptions used by the Coplanarity Checker to recognize the measured component.
    - o File 'SETTINGS.XML' on the APC is corrupt. The file could not be read correct.
- Action:
    - o Copy the 'SETTINGS.XML' file to the '\user\aPC\config\machine\' directory on the aPC.
    - o Check the 'SETTINGS.XML' file, read it with an editor and check if the file is correct syntaxed.

9. Coplanarity : Measurement result ignored. Cover was opened!
- Description:
    - o The coplanarity measurement result is ignored because the cover was open while performing a measurement. When the cover is open, the laser beam of the coplanarity checker is shut off.
- Cause:
    - o Cover is open.
- Action:
    - o Close cover and retry to perform coplanarity measurements.

10. The coplanarity checker actions are disabled
- Description:
    - o The coplanarity checker is disabled for performance reasons.
- Cause:
    - o The coplanarity checker is disabled.
- Action:
    - o If applicable, enable the coplanarity checker.

5. Maintenance and Service

5.1. Maintenance

Note: No maintenance other than mentioned in this manual may be performed on the Coplanarity laser sensor. If done otherwise; all warranty will be expired.

5.1.1. Glass plate cleaning

When   Once every 6 month
Estimated time to complete [min.]:   10
Required special tools   Soft cloth, isopropanol, lens tissues

1. Prerequisites
- Stop production.
- Power down the AX-201
- Close the shutter on the sensor

2. Clean the sensor window
- Clean the sensor window with a small amount of isopropanol and a soft cloth

Remark:
Make sure no residue is left on the glass plate. Residue can affect measurements.

3. Prepare for production
- Open the shutter
- Power up the AX-201.
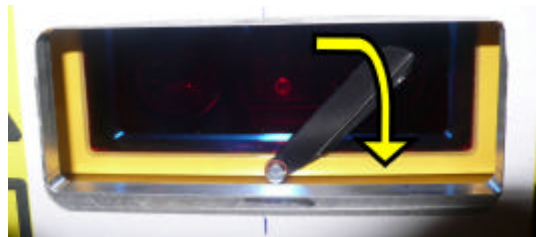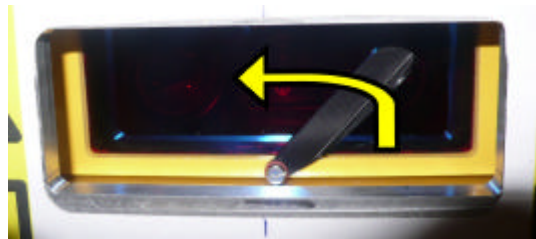
5.2. Spares

Nr	Description & Order nr	Image
1.	Safety sticker 9498-396-02441	
2.	Complete Laser sensor unit 9466-916-00051	

5.3. Repair instruction

5.3.1. Safety sticker

When   If any of the safety stickers is damaged
Estimated time to complete [min.]:   10
Required special tools   N.A.
Required part(s)   Safety sticker (9498-396-02441)

1. Prerequisites
- Locate the damaged safety sticker (s).

2. Remove the safety sticker
- Switch off and power down the AX-201
- Lock the main switch with a pad-lock
- Remove the damaged sticker

3. Place the new safety sticker
- Remove old glue and dirt from the old sticker.
- Clean the surface with isopropanol
- Place the new safety sticker on the same spot as the removed one.
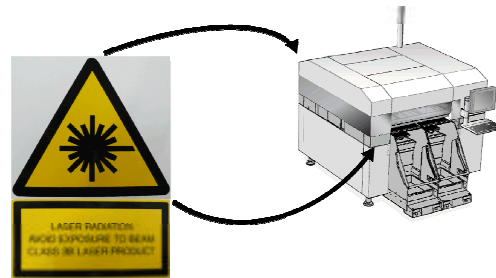
5.3.2. Laser sensor module

When	If the laser sensor is not working
Estimated time to complete [min.]:	30
Required special tools	N.A.
Required part(s)	New Laser sensor unit (9466-916-00051)

1. Prerequisites
- Contact your local service engineer.
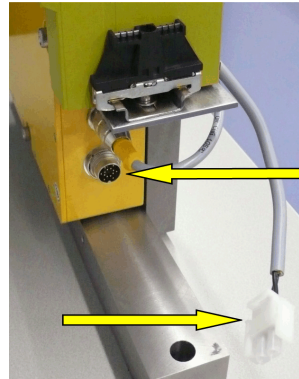- Order a NEW laser sensor unit.

NOTE: It is not allowed to open, trouble shoot or repair parts of the Laser sensor unit in or outside the AX-201. All warranty will expire.

2. Remove the Sensor Unit
- Switch off and power down the AX-201
- Lock the main switch with a pad-lock
- Disconnect the Sensor connection cable and the safety extension cable.
- Loosen the two bolds.
- Remove the unit from the base

3. Place the new sensor unit
- Place the new unit completely over the dowel pins
- Fasten the two bolds.
- Check the serial number in the 'settings.xml'. See Chapter 3.3.2.2
- Connect the sensor cable to the sensor.
- Connect the safety cable to the safety extension cable.
- Power up the AX-201.
  Follow the teach X, Y coordinates procedure (See chapter 3.3.2.5)

PHILIPS

Assembléon

Integrated electronics manufacturing solutions